CLAIMS

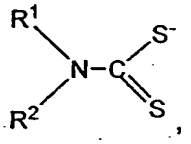
1. A composition comprising a compound comprising a formula $(M{\equiv}N)L^1$ and pharmaceutically acceptable salts thereof;

wherein N is nitrogen;

M is a transition metal; and

L^1 is a first crowned dithiocarbamate, wherein the first crowned dithiocarbamate comprises a first crown ether-containing group of formula $[(CH_2)_a\text{-}O]_b\text{-}(CH_2)_c$, wherein a is at least 2, b is at least 3, and c is at least 2.

2. The composition of Claim 1, wherein the first crowned dithiocarbamate comprises a formula:



and pharmaceutically acceptable salt thereof;

wherein R^1 or R^2 comprises the first crown ether-containing group, or R^1 and R^2 together comprise the first crown ether-containing group.

3. The composition of Claim 1, wherein the transition metal is a radioactive metal.

4. The composition of Claim 1, wherein the transition metal is ^{99m}Tc or ^{94m}Tc.

5. The composition of Claim 1, wherein the transition metal is ^{186}Re or ^{188}Re.

6. The composition of Claim 1, wherein subscript a in the formula of the first crown ether-containing group is 2, 3, 4, or 5.

7. The composition of Claim 1, wherein subscript a in the formula of the first crown ether-containing group is 2 or 3.

8. The composition of Claim 1, wherein subscript a in the formula of the first crown ether-containing group is 2.

9. The composition of Claim 1, wherein subscript b in the formula of the first crown ether-containing group is 3, 4, 5, 6, 7, or 8.

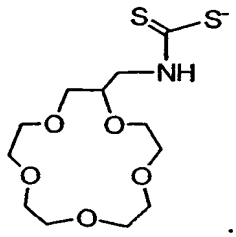
10. The composition of Claim 1, wherein subscript b in the formula of the first crown ether-containing group is 3, 4, 5 or 6.

11. The composition of Claim 1, wherein subscript c in the formula of the first crown ether-containing group is 2, 3, 4, or 5.

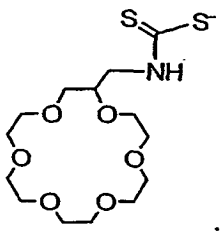
12. The composition of Claim 1, wherein subscript c in the formula of the first crown ether-containing group is 2 or 3.

13. The composition of Claim 1, wherein subscript c in the formula of the first crown ether-containing group is 2.

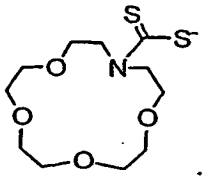
14. The composition of Claim 1, wherein the first crowned dithiocarbamate comprises



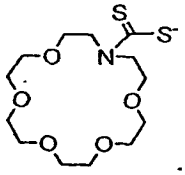
15. The composition of Claim 1, wherein the first crowned dithiocarbamate comprises



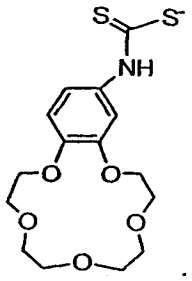
16. The composition of Claim 1, wherein the first crowned dithiocarbamate comprises



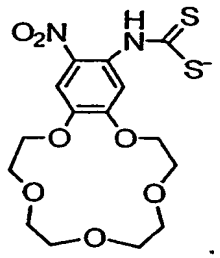
17. The composition of Claim 1, wherein the first crowned dithiocarbamate comprises



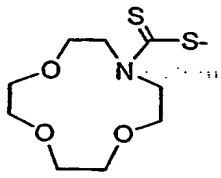
18. The composition of Claim 1, wherein the first crowned dithiocarbamate comprises



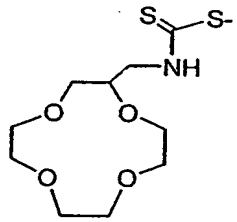
19. The composition of Claim 1, wherein the first crowned dithiocarbamate comprises



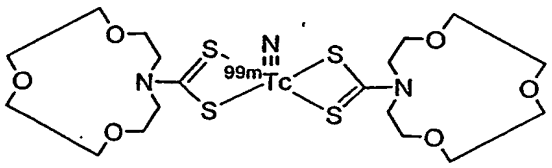
20. The composition of Claim 1, wherein the first crowned dithiocarbamate is selected from the group consisting of

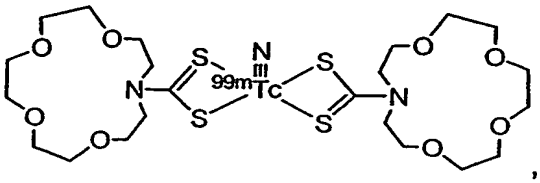


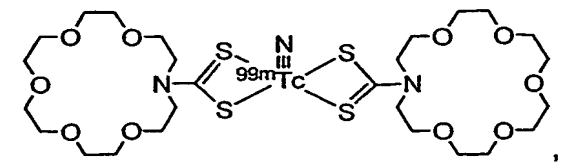
, and

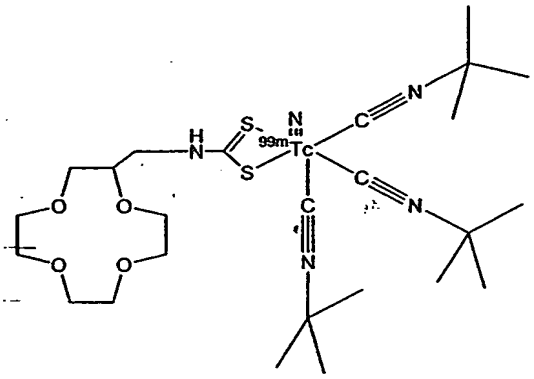


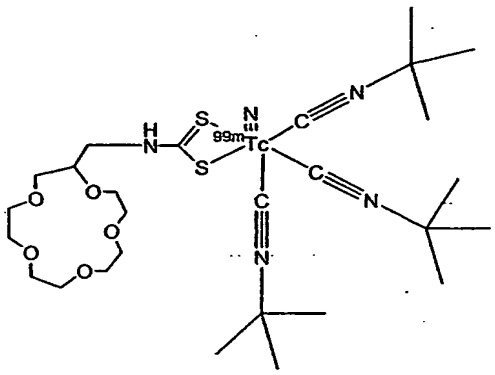
21. The composition of Claim 1, wherein the compound is selected from the group consisting of:

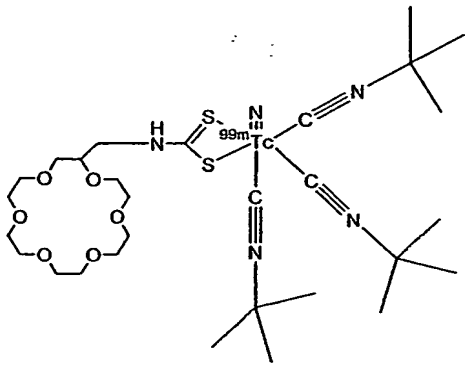










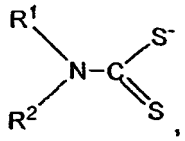


and

22. The composition of Claim 1, wherein the compound further comprises L^2 and comprises a formula $(M{\equiv}N)L^1L^2$ and pharmaceutically acceptable salts thereof;

wherein L^2 is a second crowned dithiocarbamate, wherein the second crowned dithiocarbamate comprises a second crown ether-containing group of formula $[(CH_2)_a\text{-}O]_b\text{-}(CH_2)_c$, wherein a is at least 2, b is at least 3, and c is at least 2.

23. The composition of Claim 22, wherein the second crowned dithiocarbamate comprises a formula:



and pharmaceutically acceptable salt thereof;

wherein R^1 or R^2 comprise the second crown ether-containing group, or R^1 and R^2 together comprise the second crown ether-containing group.

24. The composition of Claim 22, wherein subscript a in the formula of the second crown ether-containing group is 2, 3, 4, or 5.

25. The composition of Claim 22, wherein subscript a in the formula of the second crown ether-containing group is 2 or 3.

26. The composition of Claim 22, wherein subscript a in the formula of the second crown ether-containing group is 2.

27. The composition of Claim 22, wherein subscript b in the formula of the second crown ether-containing group is 3, 4, 5, 6, 7, or 8.

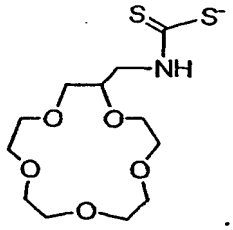
28. The composition of Claim 22, wherein subscript b in the formula of the second crown ether-containing group is 3, 4, 5 or 6.

29. The composition of Claim 22, wherein subscript c in the formula of the second crown ether-containing group is 2, 3, 4, or 5.

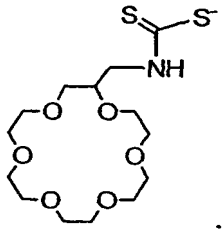
30. The composition of Claim 22, wherein subscript c in the formula of the second crown ether-containing group is 2 or 3.

31. The composition of Claim 22, wherein subscript c in the formula of the second crown ether-containing group is 2.

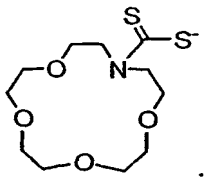
32. The composition of Claim 22, wherein the second crowned dithiocarbamate comprises



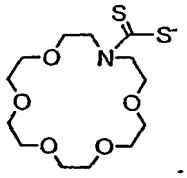
33. The composition of Claim 22, wherein the second crowned dithiocarbamate comprises



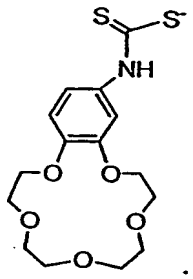
34. The composition of Claim 22, wherein the second crowned dithiocarbamate comprises



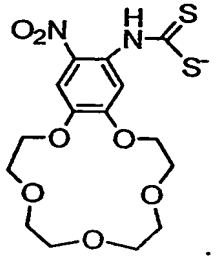
35. The composition of Claim 22, wherein the second crowned dithiocarbamate comprises



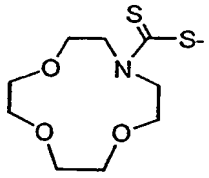
36. The composition of Claim 22, wherein the second crowned dithiocarbamate comprises



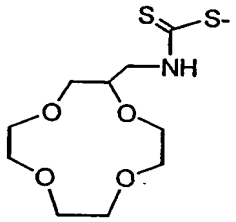
37. The composition of Claim 22, wherein the second crowned dithiocarbamate comprises



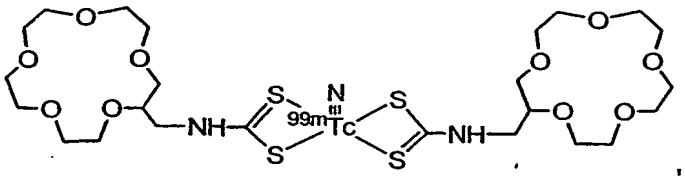
38. The composition of Claim 22, wherein the second crowned dithiocarbamate is selected from the group consisting of

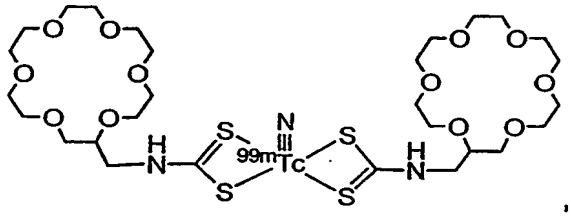


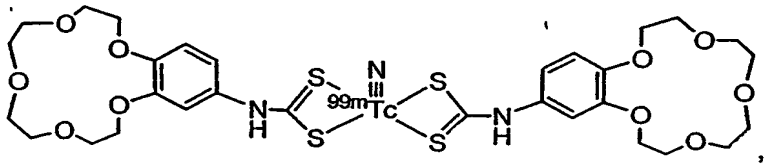
, and



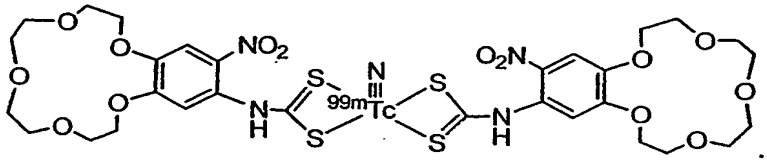
39. The composition of Claim 1, wherein the compound is selected from the group consisting of:



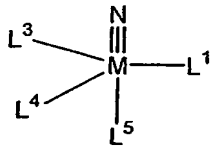




, and

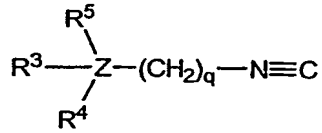


40. The composition of Claim 1, wherein the compound further comprises L^3, L^4, and L^5 and comprises a formula:



and pharmaceutically acceptable salts thereof;

wherein L^3, L^4, and L^5 each comprises an isonitrile of formula:



wherein q is 0 – 3;

Z is carbon or silicon;

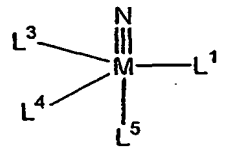
R^3, R^4 and R^5 are the same or different, and are selected from the group consisting of H, C_1-C_{10} alkyl substituted with 0-5 R^6, aryl

substituted with 0-5 R^6, heteroaryl substituted with 0-5 R^6, and macrocyclic crown ether containing 2-8 ether-oxygen atoms;

wherein R^6 is selected from the group consisting of H, OH, OR^7, $C(=O)OR^7$, $C(=O)NR^8R^9$, $PO(OR^8)_2$, $PO(NR^8R^9)_2$ and SO_2R^7; and

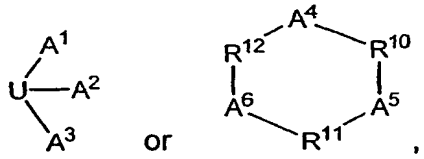
R^7, R^8 and R^9 are the same or different, and are selected from the group consisting of H, alkyl, aryl, and heteroaryl, or R^8 and R^9 together form a macrocyclic crown ether containing 2-8 ether-oxygen atoms.

41. The composition of Claim 1, wherein the compound further comprises L^3, L^4, and L^5 and comprises a formula:



and pharmaceutically acceptable salts thereof;

wherein L^3, L^4, and L^5 together form a tripodal chelator of formula:



wherein U is selected from the group consisting of $R^{13}B$, CR^{13}, and P(=O);

A^1, A^2 and A^3 are imine-N containing heterocycles;

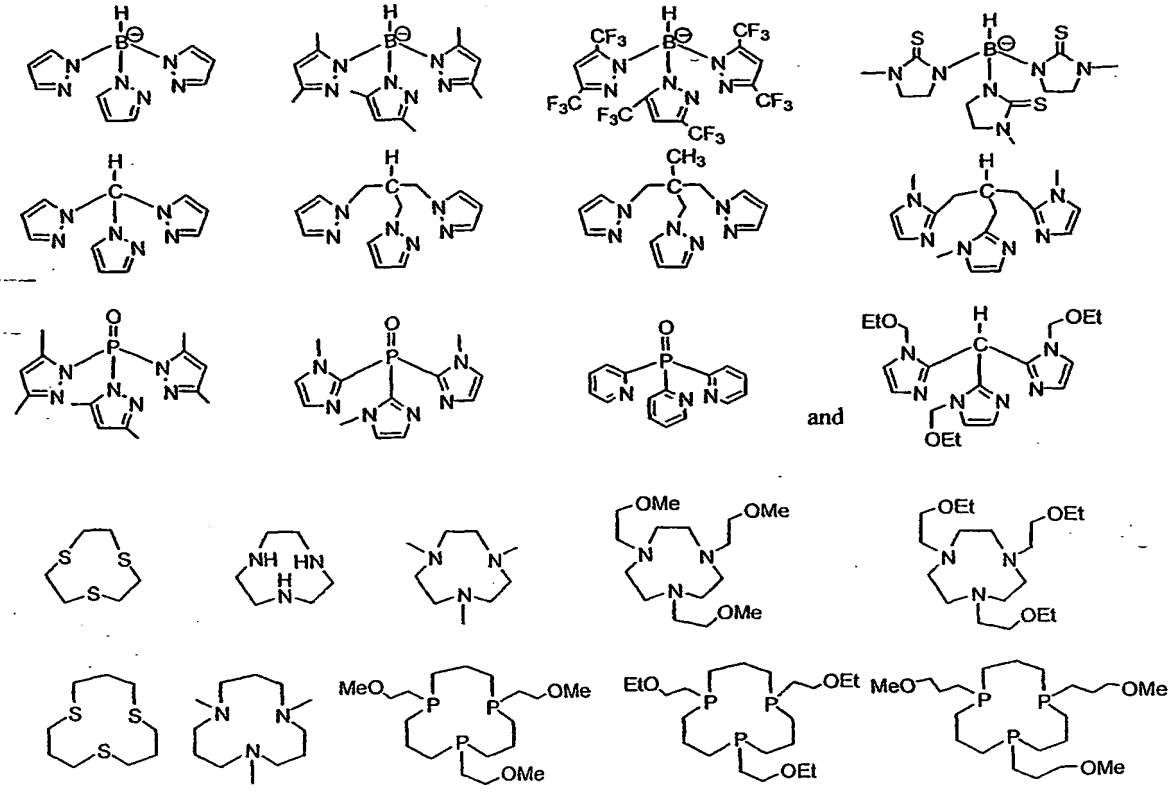
A^4, A^5 and A^6 are selected from the group consisting of NR^{14}, PR^{14}, S, and O;

R^{10}, R^{11} and R^{12} are selected from a group of formula $-(CH_2)_g-$, wherein g is 2-5;

R^{13} is selected from the group consisting of H, alkyl and aryl; and

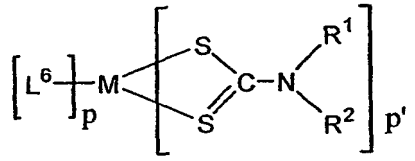
R^{14} is selected from the group consisting of H, alkyl, aryl, and alkoxyalkyl.

42. The composition of Claim 41, wherein the tripodal chelator is selected from the group consisting of



and

43. A composition comprising a compound comprising a formula:



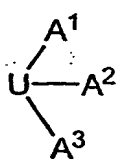
and pharmaceutically acceptable salt thereof;

wherein M is a transition metal selected from the group consisting of Fe(II), Fe(III), Mn(II), Mn(III), Co(II), Co(III), Ni(II), Cu(II), Zn(II), Ru(II), Ru(III), Pd(II), and Pt(II);

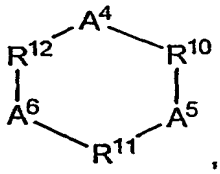
p and p' are integers and are independently selected from 0-2;

R^1 and R^2 comprise a crown ether-containing group of formula $[(CH_2)_a-O]_b-(CH_2)_c$, wherein a is at least 2, b is at least 3, and c is at least 2, or wherein R^1 and R^2 together comprise the crown ether-containing group;

L^6 is a tripodal chelator with a formula selected from the group consisting of



and



wherein U is selected from the group consisting of $R^{13}B$, CR^{13}, and P(=O);

A^1, A^2 and A^3 are imine-N containing heterocycles;

A^4, A^5 and A^6 are selected from the group consisting of NR^{10}, PR^{10}, and S;

R^{10}, R^{11} and R^{12} are selected from a group of formula $-(CH_2)_g-$, wherein g is 2-5;

R^{13} is selected from the group consisting of H, alkyl and aryl; and

R^{14} is selected from the group consisting of H, alkyl, aryl, and alkoxyalkyl.

44. A method for radioimaging a subject comprising:

a) providing

i) a subject; and

ii) a composition comprising a compound comprising a formula $(M\equiv N)L^1$ and pharmaceutically acceptable salts thereof;

b) administering the composition to the subject; and

c) scanning at least a portion of the subject using a radioimaging device;

wherein N is nitrogen;

M is a radioactive transition metal; and

L^1 is a first crowned dithiocarbamate, wherein the first crowned dithiocarbamate comprises a first crown ether-containing group of formula $[(CH_2)_a\text{-}O]_b\text{-}(CH_2)_c$, wherein a is at least 2, b is at least 3, and c is at least 2.

45. The method of Claim 44, wherein at least a portion of the subject is tissue suspected of being diseased.

46. The method of Claim 44, wherein the at least a portion of the subject is myocardial tissue.

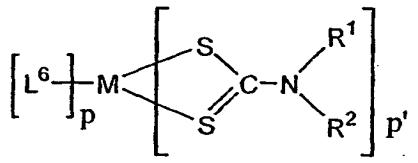
47. The method of Claim 44, wherein the subject is a mammal.

48. A method of treating a disease resulting from overproduction of nitric oxide or reactive oxygen species, comprising:

a) providing:

i) a subject with a disease; and

ii) a composition comprising a compound comprising a formula:



and pharmaceutically acceptable salt thereof; and

b) administering the composition to the subject;

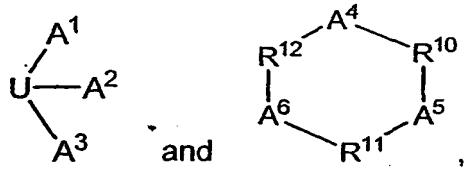
wherein M is a transition metal selected from the group consisting of Fe(II), Fe(III), Mn(II), Mn(III), Co(II), Co(III), Ni(II), Cu(II), Zn(II), Ru(II), Ru(III), Pd(II), and Pt(II);

p and p' are integers and are independently selected from 0-2;

R^1 and R^2 comprises a crown ether-containing group of formula $[(CH_2)_a\text{-}O]_b\text{-}(CH_2)_c$, wherein a is at least 2, b is at least 3, and c is at

least 2, or wherein R^1 and R^2 together comprise the crown ether-containing group;

L^6 is a tripodal chelator with a formula selected from the group consisting of:



wherein U is selected from the group consisting of $R^{13}B$, CR^{13}, and P(=O);

A^1, A^2 and A^3 are imine-N containing heterocycles;

A^4, A^5 and A^6 are selected from the group consisting of NR^{10}, PR^{10}, and S;

R^{10}, R^{11} and R^{12} are selected from a group of formula $(CH_2)_g$-, wherein g is 2-5;

R^{13} is selected from the group consisting of H, alkyl and aryl; and

R^{14} is selected from the group consisting of H, alkyl, aryl, and alkoxyalkyl.

49. A method of treating metal poisoning, comprising:

a) providing:

i) a subject with metal poisoning, and

ii) a composition comprising a crowned dithiocarbamate; and

b) administering the composition to the subject;

wherein the crowned dithiocarbamate comprises a crown ether-containing group of formula $[(CH_2)_a\text{-}O]_b\text{-}(CH_2)_c$, wherein a is at least 2, b is at least 3, and c is at least 2.